

MULTIMEDIA



UNIVERSITY

STUDENT IDENTIFICATION NO

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# MULTIMEDIA UNIVERSITY

## FINAL EXAMINATION

TRIMESTER 2, 2015/2016

**BMR 3174 SUPPLY CHAIN MANAGEMENT**  
(All sections / Groups)

11<sup>th</sup> March 2016  
9.00 a.m. – 11.00 a.m.  
(2 Hours)

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### INSTRUCTIONS TO STUDENTS:

1. This Question paper consists of 7 pages only.
2. **Section A:** Answer all **TWO (2)** questions.  
**Section B:** Answer any **TWO (2)** of the **THREE (3)** questions.
3. The distribution of the marks for each question is given at the end of each question.
4. Please write all your answers in the Answer Booklet provided.

**SECTION A:****INSTRUCTION: ANSWER ALL QUESTIONS (50 MARKS)****QUESTION 1**

MMU's FOB is looking for a single information centre location to distribute flyers for new programme offerings in the town as shown in Figure 1. The main building CAVENDISH, as assigned with a number "9", is expected to host 5000 visitors per day. Three other locations, which are smaller, are located and labelled as "6" for BUSINESS SCHOOL & STUDENT HUB, "12" for ARTS AND CULTURE DEVELOPMENT SITE and "15" for BENZIE. These locations host 4000, 1000 and 2000 visitors respectively.

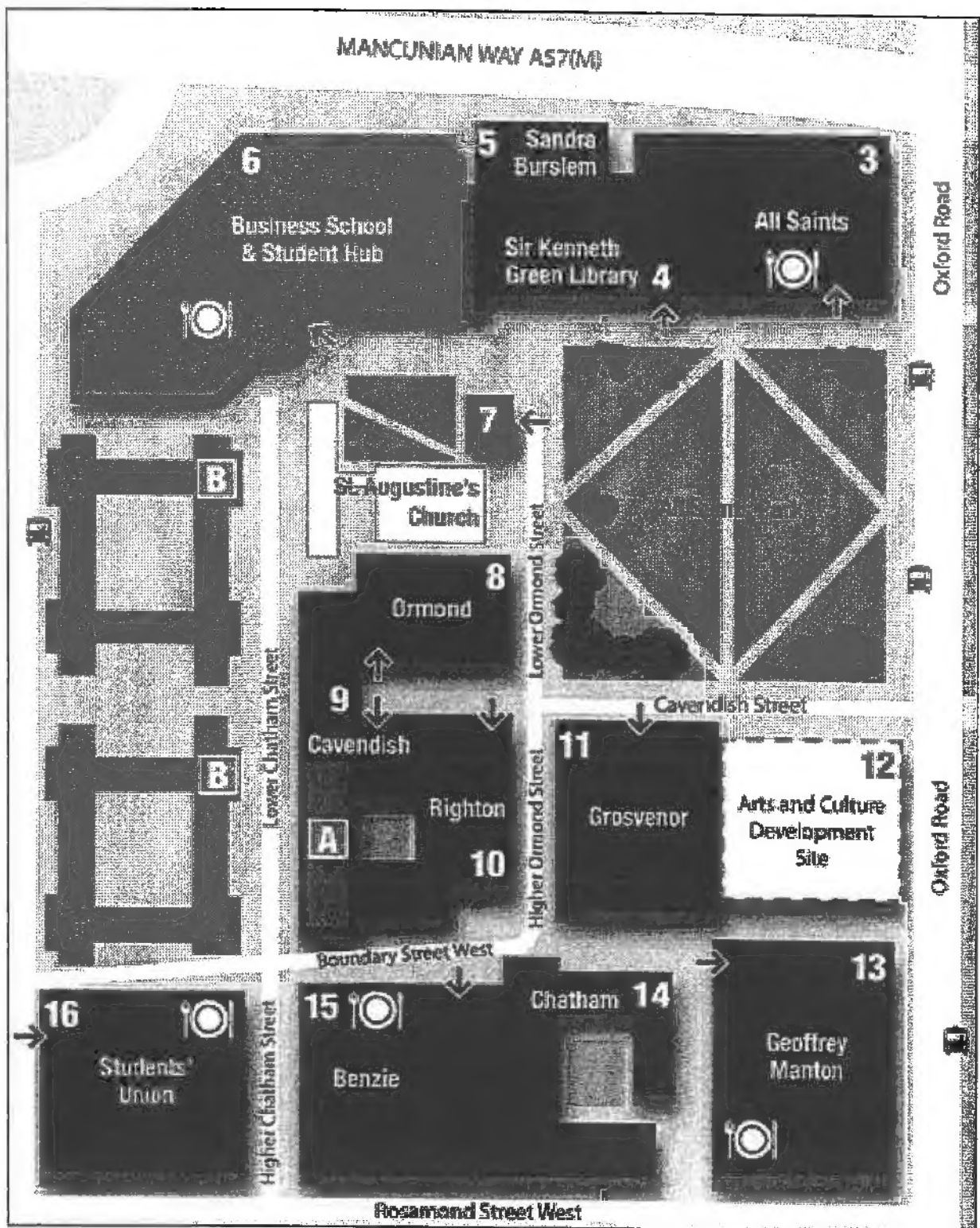
Note: 1) The *scale* of the map is 1cm to 100meter.

2) Assume the assigned number as the centre point of location.

You are required to

- a) Find a new single central location via centre of gravity (the ideal coordinates - X Y - in cm). Estimate to ideal coordinates by rounding numbers to the nearest 0.5cm.  
(5 marks)
  - b) Based on the outcome of a), estimate the rectilinear load-distance, going from the new single centre location to all the four existing (9, 6, 12 and 15) locations.  
(6 marks)
  - c) What if FOB wants to set up an information centre in either at "6" BUSINESS SCHOOL & STUDENT HUB or "15" BENZIE, which location would you recommend? Estimate via rectilinear load-distance.  
(12 marks)
  - d) If you can travel 100meter in 5 minutes, going a single trip from location "12" ARTS AND CULTURE DEVELOPMENT SITE to "6" BUSINESS SCHOOL & STUDENT HUB will take how long?  
(2 marks)
- [25 marks]

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## QUESTION 2

The table shows ABC company's aggregate demand for the next 8 months and the initial operating cost. Currently the ABC company is engaging 16 workers. A worker can produce an average of 100 regular production units per month. Each worker puts in 200 hours per month. Payroll costs are RM 1,600 per worker for regular production units per month.

Forecast Aggregate Demand

Month	Jan	February	March	April	May	June	July	August
Demand	1,400	1,600	1,800	1,800	2,200	2,200	1,800	1,400

Operating Cost

Previous quarter's output	1600 units
Beginning inventory	200 units
Stockout cost	\$100 per unit
Inventory holding cost	\$10 per unit at end of month
Hiring workers	\$3200 per worker
Firing workers	\$8000 per worker
Subcontracting cost	\$75 per unit
Unit cost (Material)	\$30 per unit
Overtime	\$15 extra for each additional unit ( <b>Overtime is limited to the maximum 20% of regular production units. No change in production rate per unit regardless of regular time and overtime</b> )

Which of the following production plan is lower:

- a) Plan A—level strategy, calling for a one-time adjustment of the workforce before month Jan begins. **The warehouse now constraints the maximum allowable inventory on hand per month to 600 units or less.** Stockout and Subcontracting options are not permitted.

(12 marks)

- b) Plan B—Mixed strategy. The company has to use Chase Strategy for the first four months and follow with Level Strategy for another four months. **Warehouse can keep 1000 units or less per month regardless of Chase or Level Strategy up to month July.** However the company has to keep **400 units as closing inventory** at the end of month August. The company limits the maximum allowable Stockout and Subcontracting to **50 units each** for the entire period. **The total number of hiring must match (equal) the total number of firing.**

(13 marks)

[Total: 25 marks]

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**SECTION B:****INSTRUCTION: ANSWER ANY TWO (2) QUESTIONS (50 MARKS)****QUESTION 3**

A project has the following activities, times, precedence relationships, normal cost and crash cost.

Activity	Time (Days)	Normal Cost (RM)	Crash Time (Days)	Crash Cost (RM)	Preceding Activities
A	5	200	3	400	None
B	8	500	7	800	None
C	10	1000	8	1200	A
D	3	300	2	700	A, B
E	2	400	1	500	B
F	8	800	5	1400	D
G	2	200	2	200	E, F
H	7	600	4	900	G
I	8	700	6	1500	C, F

Calculate the following

- Draw a precedence diagram for the above activities. (3 marks)
- Compute the earliest start times, earliest finish times, latest start times, latest finish times and slack times. Write these values in the precedence diagram (6 marks)
- Determine the critical path. (2 marks)
- How long is this project estimated to take? (2 marks)
- Crash the project to lowest possible days and estimate the new project cost. This is because there is a RM100-per-day penalty for each day the project is delayed beyond day 22. In addition, the indirect cost per day is RM250. (12 marks)

[Total: 25 marks]

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**QUESTION 4**

Mr Mazni, the FOB's manager has a new operation room under consideration for student's registration and application related matters. The philosophy of FOB is to provide the best operation layout possible so that admin staff can devote their time and energy to service improvement. You have been asked to evaluate the operation layout based on the information given.

**Number of trips between work stations**

	To	Counter Service (CS)	Photostat (PT)	Key in online (KI)	Storing Forms (SF)	Retrieving Forms (RF)
From						
CS		0	8	13	0	0
PT		5	0	3	3	8
KI		3	12	0	4	0
SF		3	0	0	0	5
RF		0	8	4	10	0

Current Building Layout. There are 10 available layout areas and they are labelled in alphabetic order (A, B, C...J)

	A	B	C	
J				D
I	H	G	F	E

**Distance Between Layout Areas (meters)**

	A	B	C	D	E	F	G	H	I	J
A	0									
B	4	0								
C	8	4	0							
D	16	12	2	0						
E	20	16	12	4	0					
F	16	12	8	2	4	0				
G	12	8	12	12	8	4	0			
H	8	12	16	16	12	8	4	0		
I	12	16	20	20	16	12	8	4	0	
J	2	12	16	16	20	16	12	2	4	0

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Determine the following

- a) Total weighted-distance score (meters) if Mr Mazni assigned the following work stations into the layout areas as below (for instance, counter service (CS) into layout area of I etc)

<b>I</b>	<b>H</b>	<b>G</b>	<b>F</b>	<b>E</b>
<b>(CS)</b>	<b>(PT)</b>	<b>(KI)</b>	<b>(SF)</b>	<b>(RF)</b>

(10 marks)

- b) A new layout that must be able to reduce its total movement by at least 20% from the existing layout of the a). Students are required to adhere to the current building layout and to assign all the five work stations into any five of the available layout areas (Assuming Mr Mazni is willing to reset all the work stations). Propose a new layout and calculate the new total weighted-distance (meters)

(15 marks)

[Total: 25 marks]

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**QUESTION 5**

XYZ company has a project with the following activities, times and precedence relationships. The total production is 300 units per 8 hour shift.

Activity	Time (Minutes)	Preceding Activities
A	0.2	None
B	0.4	A
C	0.3	None
D	1.3	B, C
E	0.1	None
F	0.8	E
G	0.3	F, D
H	1.2	G

- a) Draw a precedence diagram for the assembly line. (2 marks)
- b) Determine the cycle time. (2 marks)
- c) Determine the theoretical minimum number of workstations. (2 marks)
- d) Currently the company has two workstations only. Balance the line based on two work stations' cycle time and the most follower element decision rule. What is the efficiency? (8 marks)
- e) If the company wants to produce 360 units of outputs, how many workstations will be needed? Balance the line using the longest work element decision rule, and then, calculate its efficiency (9 marks)
- f) Determine the efficiency if only 3 workstations are allowed. (2 marks)

[Total: 25 marks]

**End of Page.**